

is made by wire EDM process. Gold brazing is used to attach upstream and downstream flanges and a sleeve over helical water channels. A bevel groove for a spring is provided on the downstream side for rf continuity.

3.4 Absorber: Vertical Beam Scraper

A vertical beam scraper, consisting of upper and lower independently driven blades, is used in the storage ring for beam diagnostics. Figure 5 shows a part of the upper blade subassembly. A rectangular block of tungsten (a high Z material) is used for scraping the electron beam. Because of its poor thermal conductivity, the tungsten block cannot absorb 53 watts/mm of the incident x-ray beam power.

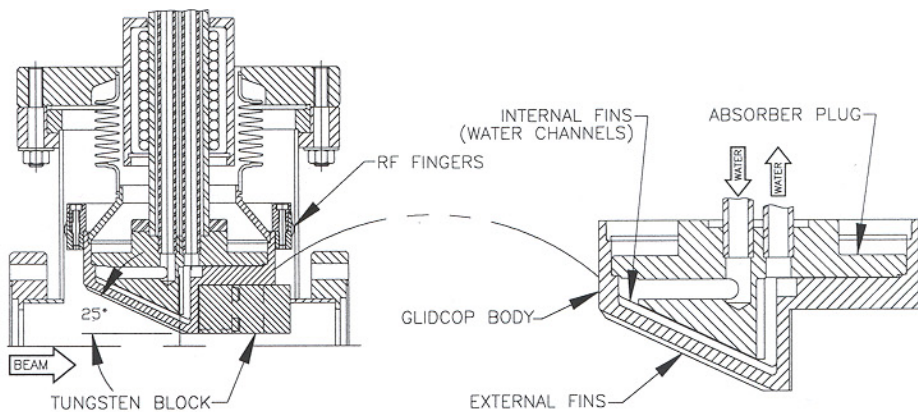


Fig. 5: An absorber shielding one of the vertical scraper blades.

To shield the tungsten block from intense x-rays, a Glidcop absorber is attached on its upstream side. The front face of the absorber intercepts the beam at 25° to reduce the incident power density. External surface fins are used (as in the crotch absorber) to split the beam footprint. Internal fins in the water channels enhance heat transfer and reduce deformations due to water pressure.

3.5 Transition Absorber

Figure 6 shows a transition absorber built within a double-sided 6”(152 mm) flange, which allows it to be inserted in tight spaces. Water tubes are brazed to the flange, to an absorber plate with an elliptical aperture, and to an external manifold. The absorber plate, made from Glidcop or OFHC copper depending on the incident beam power, is also brazed to the flange for structural strength.

The elliptical aperture is approximately 4 mm smaller all around than the nominal vacuum chamber aperture. The latter is an ellipse with major and minor radii of 42 mm and 21 mm, respectively. This absorber can, therefore, protect downstream components that fall within its shadow, which extends up to 0.5 meters for the maximum specified beam deviation of 8 mrad. A nearly parabolic profile of the elliptical aperture is selected to spread the incident beam and to reduce rf impedance of the aperture. In